MSCI
MASTER OF SCIENCE IN CLINICAL INVESTIGATION PROGRAM

TRAINING IN PATIENT-ORIENTED RESEARCH

VANDERBILT UNIVERSITY School of Medicine
Table of Contents

1. COURSE CATALOG 3 – 22
   • Requirements for the MSCI degree 4
   • Core Course Descriptions 5 – 17
   • Selected Elective Course Descriptions 18 – 20

2. POLICIES 22 – 26
   • Admission to Individual Classes 22
   • Admission Requirements 22
   • Requirements for Graduation 23
   • Student Status 24
   • Grading Policy 25
   • Auditing 25
   • Acceptance of Transfer Credits 26
   • Grievance Procedures 26

3. MENTORSHIP GUIDE 28 – 46
   • The Concept of Mentoring 28 – 31
   • Establishing the Mentor Relationship 32 – 35
     1. Questions/exercises to facilitate clear communication and expectations, NIH-HHS Mentoring Program 34 – 35
     2. The MSCI Mentorship Agreement 36 – 37
     3. Guidelines on mentoring within a team, UCSF Mentor Development Program 38 – 39
   • Cultivating the Mentoring Relationship 40 – 45
     1. The MSCI Bi-annual Mentor evaluation 40 – 41
     2. The MSCI Bi-annual Mentee evaluation 42
     3. The MSCI Bi-annual Mentorship Committee meetings 43
     4. Mentorship Challenges and problem-solving strategies, Institute for Clinical Research Education 44 – 45
   • Assistance with the Mentoring Relationship 46
Requirements for the MSCI Degree

**DIDACTIC WORK:** Trainees must complete 35 hours of courses covering the essentials of study design, biostatistics, ethics, drug development and data analysis. It is expected that course work will comprise 20% of the trainee's time commitment. The course schedule is designed to maximize protected time for patient-oriented research.

**MENTORED RESEARCH APPRENTICESHIP:** The core of the MSCI Program will be the completion of a mentored research project. The research must be patient-oriented and involve direct measurements on patient-derived samples or the use of investigational therapeutic or diagnostic techniques. The mentor must be an established physician-scientist with experience in patient-oriented research. Use of the Vanderbilt University General Clinical Research Center will be encouraged. The research project will account for 80% of the trainee's commitment to the program.

**CAREER PATH DEVELOPMENT:** A monthly seminar series, Clinical Scientist Career Seminars, permits trainees to meet successful patient-oriented researchers. Topics of discussion will include academic “rules of the road,” time management, promotion/tenure issues, grants management, and overall program evaluation. Trainees will also hone their scientific communication skills.

**FINAL PROJECT SUBMISSION:** The trainee will submit a manuscript to a peer-reviewed journal, provide a completed proposal for a federal or major foundation grant, or develop a Master's thesis based on their research project. Completion of the thesis requirement will be evaluated by the MSCI Promotions Committee.

**Core courses comprise 35 credit hours; a minimum of 35 credit hours are required for graduation. Trainees may elect to enroll in one or more of the selected elective courses to further support their research project.**
Biostatistics I

Course Director: Daniel Byrne, MS  
Fall [4 hours credit] Byrne

This course will teach practical, modern biostatistical skills and help the student to become multilingual regarding statistical software. Students will use several statistical software packages to learn data analysis methods for reproducible research using actual clinical research data sets. Students will also learn about statistical power and sample size calculations using the software PS and nQuery Advisor. An emphasis will be placed on performing statistical analyses and interpreting output. Commonly used statistical methods will be explained as well as the techniques that experienced biostatisticians use to analyze data.

Texts & Readings:

Software:
- R
- SPSS
- STATA
- PS
- nQuery Advisor
Biostatistics II

**Core Course**

Course Director: TBD
Spring [4 hours credit] TBD

Fundamental biostatistical concepts related to multivariable analyses in existence of confounding and effect modification. Topics include Student's t-test, one-way ANOVA, linear, binary logistic, proportional odds logistic, Cox proportional-hazard regressions with emphasis in checking model assumptions. Basic concepts on repeated measures analysis including a mixed-effect and GEE regression models. Proper strategies for developing reliable multivariable models in prognostic-diagnostic research, randomized controlled trial and observational study for causation.

**Texts & Readings:**


Prerequisite, MSCI Biostatistics I 524-5009 and Epidemiology I.
Case Studies in Clinical Investigation I

Course Directors: T. Alp Ikizler, MD and Eric D. Austin, MD, MSCI
Fall [1 hour credit] Ikizler, Austin

The Case Studies I course is designed to utilize a studio process to enrich trainee research. Studios are structured, dynamic sessions which bring together relevant research experts with the purpose of enhancing research quality, improving funding success, fostering advances in clinical practice and improvements in patient health, increasing publications and generating new hypotheses. Participants include 2-6 experienced faculty, your mentor, your MSCI peers, and the MSCI program directors.

You choose the most appropriate studio depending on the stage of your research: hypothesis generation, study design, implementation, analysis and interpretation, translation, or manuscript development. Presentations should be conducted as if presenting at a research conference.

Attendance at peers’ studios is expected as it will foster critical thinking from an interdisciplinary approach, collegiality, and collaboration.
Case Studies in Clinical Investigation II

Course Directors: T. Alp Ikizler, MD and Eric D. Austin, MD, MSCI
Spring [1 hour credit] Ikizler, Austin

The Case Studies II course provides an opportunity to present and discuss the progress and results of trainees’ primary MSCI projects. In accomplishing this goal, the course utilizes a studio process and/or presentation format.

You choose the most appropriate format depending on the stage of your research: presentation, manuscript studio, data analysis studio, or grant review studio. Studios will be conducted in the same manner as in Case Studies I. Presentations should be conducted as if presenting at a research conference.

Attendance at peers’ studios is expected as it will foster critical thinking from an interdisciplinary approach, collegiality, and collaboration.
Clinical Scientist Career Seminars

Course Directors: T. Alp Ikizler, MD and Eric D. Austin, MD, MSCI
Fall and Spring [1 hour credit] Ikizler, Austin

Topics of discussion will include academic “rules of the road,” time management, promotion/tenure issues, grants management, and overall program evaluation. Trainees will hone their scientific communication skills through an annual presentation at this forum.

Although you engage in the seminars throughout your MSCI matriculation, you only receive credit once.
Clinical Trials

Course Director: Yu Shyr, PhD
Fall [3 hours credit] Shyr

Design and data analysis for clinical trials in biomedical research. Primary topics include specification of study objectives, design options, ethical guidelines, randomization, blinding, sample size determination and power analysis, interim monitoring and data analysis appropriate for parallel, crossover, nested, factorial and group allocation designs. Other topics include role of FDA in the drug approval process, adaptive trial designs, non-inferiority trials and bio-equivalence trials. Emphasis is on practical use of methods rather than formal statistical theory.

Texts & Reading:

Drug and Device Development

Course Director: J. Matthew Luther, MD, MSCI
Summer [3 hours credit] Luther

This seminar styled course is designed to provide an overview of the drug and device development process and will include issues of drug discovery, pre-clinical drug development, Phase I through IV human testing, device development and the role of the FDA in regulatory affairs. Learning objectives will include:

1. An overview of the process of drug development from initial compound discovery, through clinical trials, to post-marketing issues;

2. An overview of device development, and to be able to contrast this to the process of drug development; and

3. An introduction and some insight into the function of the Food & Drug Administration (FDA).
The course will provide an introduction to the principles of the design and analyses of evidence based clinical studies. The course will cover the concept of causation versus prediction, the design of (clinical) epidemiological research, measures of disease frequency and association, validity issues including confounding, and the generalizability of research to practice. Subsequently the course addresses in more detail the design and analysis of diagnostic, prognostic, therapeutic, and etiologic (side effects) research.

Texts & Reading:
Grant Writing

Course Director: Sunil Kripilani, MD, MSc, SFHM
Summer [1 hour credit]

Principles of scientific written and oral communication, with a focus on grant writing will be discussed. The principles of scientific grant writing will include how to write the background and significance, previous work, and methods sections. Students will review grants submitted to public health service study sections, participate in a mock study section, and prepare a sample grant application. Enrollment is limited.
Master’s Research

Core Course

Course Directors: T. Alp Ikizler, MD and Eric D. Austin, MD, MSCI
Summer [1 hour credit] Ikizler, Austin
Fall [3 hours credit] Ikizler, Austin
Spring [3 hours credit] Ikizler, Austin

Trainees will participate in this course throughout the first and second years of the MSCI program. The Master’s Research course, along with the Case Studies series, is designed to guide trainees to the successful completion of the Master’s Final project.

All trainees are required to spend a minimum of 80% time in research activities, which include didactic coursework and activities within the mentor’s lab.
Medical Writing for Clinical Investigators

Course Director: Daniel Byrne, MS
Spring [2 hours credit] Byrne

This course is designed to teach clinical investigators medical writing skills required to publish scientific articles in a peer-reviewed medical journal. Since trainees in the MSCI program are expected to complete their Master’s thesis based on their research project in the Spring of year 2, this course is scheduled prior to this deadline to assist students in writing their thesis/paper. Teaching will consist of demonstrations and discussions of how to improve the writing quality using each student’s thesis-in-progress as an example. Students will be expected to write and revise their Master’s thesis as course-work, no additional written assignments will be required.
Molecular Medicine

Course Director: TBD
Spring [4 hours credit] TBD

The goal of this course is to provide an overview of molecular medicine and update the students’ knowledge base in this rapidly evolving field. Lectures cover broad topics and are intended to help students understand and explore primary literature and to inform students on available molecular resources that can complement their own research interests. Each module of the course will consist of a two hour didactic lecture delivered by basic science faculty addressing a fundamental process of molecular biology. Each lecture will be followed by a one hour group discussion where the class is divided into 2 groups, each with a facilitator. The group discussion will focus on the topic of the lecture, with an opportunity for students to discuss their own reading they have done in preparation for the lecture. Specific research methods and experimental systems not covered in the lectures will also be discussed.

Texts & Readings:
- Recommended: Alberts et al, eds: *Molecular Biology of the Cell*
Research Ethics and Scientific Integrity

Course Director: Elizabeth Heitman, PhD
Spring [1 hour credit] Heitman

This course is a systematic examination of the ethical concepts and standards of responsible conduct of research in biomedical science and clinical investigation. Its aim is to provide post-doctoral and graduate trainees in clinical research a framework in which to recognize, examine, resolve, and prevent ethical questions and conflicts in their professional work.

Objectives:
Upon successfully completing this class, students will be able to:
1. Trace the historical development and critique concepts of scientific integrity and research ethics – including legal and socio-religious influences – in biomedical science and clinical investigation;
2. Recognize, identify, and analyze questions central to the ethical problems in biomedical science and clinical research using relevant professional and regulatory standards.
3. Formulate recommendations for preventing and/or resolving ethical conflict in biomedical science and clinical research and promoting responsible conduct of research; and
4. Identify the appropriate institutional resources for addressing questions related to ethics and integrity in biomedical science and clinical research in academic and nonacademic settings.
Selected Elective Courses

BMIF300 Foundations of Biomedical Informatics
This introductory course examines the unique characteristics of clinical and life science data and the methods for representation and transformation of health data, information, and knowledge to improve health care. Principles of information security and confidentiality are taught, along with functional components of information systems in clinical settings and the use of databases for outcome management. Through skill modules, the course provides an introduction to methods underlying many biomedical informatics applications, including information retrieval, medical decision making, evaluation of evidence and knowledge representation. The historical evaluation of the field of biomedical informatics is taught concurrently, using examples of landmark systems developed by pioneers in the field.
FALL [3] S Weinberg

CANB340 Introduction to Cancer Biology
A multi-disciplinary course designed to expose students to all areas of basic and applied cancer research. Emphasizes the molecular mechanisms underlying carcinogenesis and tumor progression and their relationship to clinical aspects of the disease.
Fall [4 hours credit] Yull

HGEN 333 Analytic Techniques for Genetic Epidemiology
This course will take an example-based approach to provide students with the skills necessary to conduct statistical association analysis of genetic data from human populations for genetic epidemiology studies. Topics will include quality control, statistical methods for association testing, common study design issues, future directions of genetic epidemiology and advanced topics.
Selected Elective Courses

**HGEN 340 Human Genetics I**
Designed to cover background and latest advances in human genetics. Topics will include an overview of mutational mechanisms, cytogenetics (detection and description of chromosomal abnormalities), biochemical genetics (gene defects in biochemical pathways, inborn errors of metabolism), molecular genetics (gene structure, function, and expression). Topics are discussed with reference to specific human genetic diseases.
FALL [3] Russell and Mortlock

**MSCI 5028 Data Management (alternate years – even)**
The objective of this course is to teach students the fundamentals of research data planning, collection, storage, dissemination and manipulation. Several software tools will be employed, but primary ideas should transcend individual applications (especially versions) and ultimately serve students by providing tools for use in data management for clinical investigation.

Specific goals of instruction in the course include:
1) Microsoft Excel – General to Advanced, 2) Data visualization and graphical methods, 3) Software spectrum for clinical research, 4) Productivity tips/tricks to save time (for research), 5) Practical techniques for managing research data, 6) Database theory and implementation, 7) Data collection strategies, 8) Using public health databases (freely available), 9) SQL methods for DB interface – repackaging and filtering data, 10) Easy programming methods to solve repetitive tasks, 11) Data security and best practices.
Spring [2 hours credit] Harris
Selected Elective Courses

**PUBH Epidemiology II: Non-Randomized Study Design**
The design of observational studies, including factors that are important in design selection. The design of cohort studies, including rationale for use of the cohort study, prospective and retrospective cohort studies, assembly and follow-up of the cohort, exposure measurement, outcome ascertainment, confounders, effect modification, calculation of measures of occurrence and effect, summary of multivariate statistical analyses for cohort studies. The case-control study, including rationale for use, conditions necessary for validity of the case-control study, selection of controls, sources of bias in case-control studies, and multivariate analysis. The ecological study, including when to use and when to avoid. Designs to usually avoid: cross-sectional, case-series and exposed-subject designs. The course includes didactic lectures and critical reading of important epidemiologic studies from the current medical literature. The latter encompasses discussion of the articles in small groups and structured presentation to the class. The course also includes a project, which is the development and presentation of a study design protocol to the class. This protocol is for the project that will serve as the student’s master’s thesis. Prerequisites: Epidemiology 1, Biostatistics 2, Clinical Trials, or approval of instructor. Enrollment is limited to 24 students, with priority given to MPH and MSCI students.
Spring [4 hours credit] Ray

**MSCI 5016 Research Skills**
This course offers basic instruction and practical advice on a variety of issues and skills related to the conduct of clinical research, often with computer demonstrations.
Fall and Spring [1 hour credit] Orozco
Admission to Individual Classes
Individual classes in the MSCI Program may be taken for credit by students not enrolled in the MSCI Program at the individual course tuition rate established by the Vanderbilt Board of Trust. Students admitted to individual courses must be eligible to apply for admission to the MSCI program. Exceptions may be made by the Program Director in consultation with the Course Director for classes in which certain admission requirements (such as clinical experience) are not necessary for participation in the course. Admission to individual classes is also contingent upon availability of space in the course. (See also: Auditing Classes)

Admission Requirements
Eligible candidates for the MSCI Program include:
- Board-eligible physicians enrolled in a fellowship program at Vanderbilt or Meharry Medical College,
- Residents with protected time for research,
- Vanderbilt faculty members with the consent of their Department Chair,
- Medical students in the Vanderbilt Medical Scholars Program,
- Post-Doctoral PhDs anticipating a career in patient-oriented research, and
- PhD candidates in the Nursing School anticipating a career in patient-oriented research.
- Scholars external to Vanderbilt/Meharry will be considered based on the availability of a suitable mentor within Vanderbilt and secured funding.

Applications will be judged on the quality of the science proposed, on the commitment of the mentor to the career development of the candidate, and on the overall impact of the training program on the applicant’s career development.
Requirements for Graduation
To meet graduation requirements for the MSCI, student must have completed 35 hours of coursework with grades approved by the MSCI program and submission of a final project in the form of one of following:

- a submission ready extramural grant, or
- a submitted or submission-ready original article to a peer-reviewed journal

In the case that these two items cannot be completed, a thesis can be submitted. The thesis should include a brief introduction explaining why a grant or manuscript could not be prepared and submitted on a timely basis. Thesis submission is subject to preliminary approval by the MSCI directors.

It is recommended that a thesis include:

- No oral presentation is required.
- The thesis should include
  1. a brief statement of the student’s role in the work to be described in the research report
  2. 10-15 page research report outlining the hypothesis tested, background and significance of the work, the experimental approach and methods, data analysis/sample size calculations, anticipated results and pitfalls, results to date, interpretation of results, discussion of results, and future plans.

The subsequent step in the graduation process is a review and approval of each student’s manuscript, grant or thesis by our Promotions Committee.

It is anticipated all the students will complete the graduation requirements by the end of the fifth semester of enrollment. In the case of any potential delays, the student is allowed to extend the graduation date six months twice (total of one year). In unusual circumstances (including, but not limited to health problems, change of jobs, move to another institution) an additional extension up to one year will be granted. During a period of extension, the student will be enrolled in the Research Extension course, a status which incurs no tuition costs.
Student Status: Full-time or Part-Time

Full Time (Fall & Spring Terms)
Registered for 8 or more hours

Half-Time (Fall & Spring Terms)
Registered for at least 4 hours but less than 8 hours

Less than Half-Time (Fall & Spring Terms)
Registered for a course but less than 4 hours

Full Time (Summer Term)
Registered for 6 or more hours

Half Time (Summer Term)
Registered for at least 3 hours but less than 6 hours

Less than Half-time (Summer Term)
Registered for a course but less than 3 hours

Two courses, Master’s Research and Research Extension, automatically trigger full-time status.
**Grading Policy**

Students in the Master of Science in Clinical Investigation Program will be evaluated in each course. Letter grades will be given by the course director, based on attendance, class work, homework, test results, and final exams.

Letter grades will be awarded as follows:

- \( A+ = 4.0 \)
- \( A = 4.0 \)
- \( A- = 3.7 \)
- \( B+ = 3.3 \)
- \( B = 3.0 \)
- \( B- = 2.7 \)
- \( C+ = 2.3 \)
- \( C = 2.0 \)
- \( C- = 1.7 \)
- \( D+ = 1.3 \)
- \( D = 1.0 \)
- \( D- = 0.7 \)
- \( F = 0.0 \)

Only courses with a grade of \( B- \) or better will count towards the MSCI Program requirements. Courses for which a grade of \( C+ \) or lower is awarded will need to be retaken.

Master’s Research, Research Extension, and Case Studies courses are graded on a pass/fail scale and are not considered in calculation of GPA.

**Auditing**

Auditing of MSCI classes may only be allowed if the class has less than ten registered participants. Any class with over ten registered participants will not allow audits. This policy is applicable to courses administered by the MSCI program.
Acceptance of Transfer Credits
The MSCI Program allows matriculated students to transfer equivalent graduate level courses taken up to two years’ prior to admission into the Vanderbilt MSCI program. The procedure for an applicant to have credit considered for transfer is to send a letter requesting approval for transfer of the course(s), along with the student’s transcript(s) and the course syllabi. Only courses taken at accredited institutions will be considered; a maximum of 9 credit hours are allowed for transfer into the MSCI program. Determination of equivalency will be made by the Program Director in consultation with the Course Director.

If courses taken prior to admission into the Vanderbilt MSCI program are determined to meet graduation requirements, tuition will be reduced at the per-credit hour rate of the requirement that is met by the transfer.

Grievance Procedures
Students who believe their academic performance has not been judged reasonably or fairly, or who believe their intellectual contributions have not been fairly acknowledged, should consult the Program Director. The MSCI program follows procedures described in the School of Medicine handbook, which include encouraging the student to seek redress of a problem as soon after receiving the grade and in no case later than six months after the event.

A Director of the MSCI Program will serve as liaison and counselor for issues that arise between mentor and trainee. For a situation that cannot be resolved with the assistance of an MSCI Director or a grievance that may arise between a trainee and the MSCI program, a grievance committee will be assembled. The grievance committee will consist of the Senior Associate Dean for Faculty and Administrative Affairs or designate, two MSCI mentors unaffiliated with the involved parties, and the MSCI Student Representative.

The grievance committee will assemble the details of the situation and make a written recommendation that is presented to the Directors of the MSCI program and to the grievant, who may provide written comment on the recommendations.

The Directors of the MSCI program will review all of the relevant materials, reach a conclusion on the resolution of the grievance, and send a written copy of the final recommendation to the grievant. The grievant may appeal this decision to the Dean of the School of Medicine.
Vanderbilt MSCI Mentoring

MSCI Expectations and Resources

2014-2016
Mentoring
Seven Roles and Some Specifics

Martin J. Tobin
Division of Pulmonary and Critical Care Medicine, Loyola University of Chicago Stritch School of Medicine and Hines Veterans Affairs Hospital, Hines, Illinois

In Homer’s legend, when Ulysses, the king of Ithaca, went away to make war on the Trojans, he left his infant son, Telemachus, in the hands of Mentor (1). Ulysses was gone for twenty years, and Mentor guided Telemachus in practical skills, such as archery and wrestling, and also provided advice on moral matters. Giving advice, however, is naive and presumptuous (2). Naive, because experience cannot be transmitted; instead, each generation has to acquire it for itself. Presumptuous, because no one has a monopoly on wisdom; and those imagining themselves well endowed are the least wise (3).

Books containing advice for young professionals come in two forms: compendia of tedious pieties, and amoral manuals of dodges and shady practices for getting on in the world (4). An attempt to provide a noncynical description of the good mentor inevitably falls into the former category and exposes an author to accusations of moralizing oversimplification. Yet fear of being labeled a self-righteous moralizer is insufficient defense for shying away from the challenge.

A mentor can be defined as an older academician who takes a special interest in a younger person—a fellow or a junior member of faculty (1). The older person is called the mentor, but there is no good term for the younger person (5). The lack of a self-evident term to describe the object of the mentor’s interest bespeaks of much confusion on the subject. I focus solely on the mentoring of a fellow who wants to become a physician-researcher. I make liberal use of quotations, not simply for calling on authority to buttress my case but for the illumination they provide.

SEVEN ROLES

The physician-researcher as mentor has at least seven roles to fill: teacher, sponsor, advisor, agent, role model, coach, and confidante (1, 6, 7). The mentor needs to customize each role to match the characteristics of the fellow. The following description is an ideal after which mentors strive. It is also an ideal that perhaps no mentor can fully attain.

Teacher

The mentor and laboratory assistants teach the fellow the technical skills unique to their field of research. The mentor guides the fellow in how to read in an efficient manner and how to reason from first principles. The fellow learns to write scientific manuscripts by getting back drafts covered in red ink. The mentor teaches the fellow how to apply for grants, and how to review manuscripts (8). The mentor knows that education is not just the imparting of facts—after all, these can be obtained in a book (9). Instead, the ultimate goal of education is the formation of character (the aggregate of qualities that constitute the moral backbone of an individual) (10, 11). Henry Adams encapsulated the legacy of teaching: “A teacher affects eternity; he can never tell where his influence stops.”

Sponsor

As sponsor, the mentor introduces the fellow to a new social world (6). Up to now, the fellow’s world has been parochial. To succeed in research, the fellow needs to learn who’s who among the cast of characters in a subdiscipline. When the fellow first presents a research poster, the mentor lists researchers who have a reputation for helping young people. When these individuals come by the poster, the mentor tells the fellow to be very open in discussing limitations of the study because they will help fix them. The mentor also names another set of individuals who get pleasure out of belittling a fellow, warning the fellow to be on guard when interacting with them. Over time, the mentor instills in the fellow the values and customs that make up the norms of science.

Advisor

The mentor serves as advisor and counselor (1, 7). The fellow needs a sounding board and reality check to help refine ideas and gain clarity of thought. Being older, the mentor supplies the missing experience—been there, done that. The fellow doesn’t need someone to pave the road, but needs help in becoming a better navigator. The mentor doesn’t try to personally solve the fellow’s problems, but helps the fellow craft his or her own solution—to become self-reliant. The mentor is not a nursemaid or escort, but a catalyst for growth (5). A good mentor is an amateur psychoanalyst, understanding what makes people tick. The mentor’s greatest contribution may be in listening, saying little. As Rousseau told us, people who know a lot tend to say very little, whereas people who know little speak a lot. A good mentor understands that it is best to give advice only when it is requested (12).

Mentoring should not be confused with being a faculty advisor (7, 13). With the latter, the exchange is relatively formal, largely unidirectional, with little if any personal bonding. The exchange may occur only once, whereas mentoring involves years of repeated back and forth, eyeball to eyeball. A student may not view the faculty advisor as a role model, whereas a mentor is always seen as a role model.

Agent

The mentor acts as an agent (7). The fellow knows the mentor will go to bat for him or her. The mentor removes obstacles, but only after the fellow has made a convincing attempt. And the mentor is careful to avoid spoonfeeding, which stunts the development of independence.
Role Model

The fellow views the mentor as a role model and wants to emulate his or her approach to academic life (14). Young people do not assimilate values by listing attributes they wish to develop (truth, caring, judgment) and looking up their definitions (15). Instead, they identify with people who appear to have these attributes, and emulate their behavior. Fellows do not learn values from having them preached at them, but from seeing values enacted in the routine of daily life. Values are best transmitted through deeds, not words—a how, not a what. And that is why role models are so important in medicine.

The fellow observes the mentor’s professional priorities. The time devoted to helping colleagues, such as volunteer work in reviewing manuscripts that goes uncredited by promotion committees (16). The mentor’s intellectual and scholarship style: it must be unmistakable that he or she enjoys learning. The approach to thoroughness and truth telling. The mentor’s ability to make work appear more fun than fun, and make drudgery appear worthwhile. Success in research can lead to arrogance, to make work appear more fun than fun, and make drudgery appear worthwhile. Success in research can lead to arrogance, although Claude Bernard believed true scientific prowess leads to a proportional decrease in pride (17). The fellow sees how the mentor interacts with peers: the exercise of restraint, and to a proportional decrease in pride (17). The fellow sees how the mentor interacts with peers: the exercise of restraint, and the instinct for maneuvering between behavior that might be uncomfortably allowed and behavior that is impermissible. The fellow sees the moral element in the mentor’s identity: how the mentor defines what lines will not be crossed, and why (18). The bulk of the fellow-mentor interaction is in the research setting, but the mentor’s behavior as a clinician—irrespective of whether his or her research is basic or patient oriented—will determine how well the mentor transmits the values of academic medicine. It must be crystal clear that the patient is always first priority. The core values articulated by the mentor must be evident in actions: he or she must walk the talk. When a mentor fails to practice what is being preached, the hypocrisy mutes the effectiveness of the advice (19).

Role models and mentors are often confused (5). Most people who serve as role models do not act as mentors. Michael Jordan is a role model for thousands. If he is to become a mentor, it will only be for a handful of people. Likewise, William Osler was a role model for thousands of physicians, but mentored only a few. Many role models are like bright shining stars: as you get closer, they seem too hot to touch (5). Most physician trainees never have a true mentor—there are not enough to go around (5, 6, 13). They have role models and faculty advisors. Having a real mentor will always be a privilege of only a few.

Coach

A good coach motivates the players to win. Knowing when to offer encouragement. When to push. And when to pause and take a break. A mentor has to push for action while tolerating inaction—a cause of considerable tension in the mentor (12). A basketball coach is judged by the success of the players, not by his or her own skill at shooting baskets. Likewise, a mentor recognizes that it is far easier to give a lecture than to guide a fellow in how to do it.

Motivating is the fulcrum around which coaching revolves. The mentor conveys the sense of awe about the workings of the body: the excitement in helping to unravel its complexity. He or she imbues the fellow with the power of science, the best hope for achieving progress (20). Science doesn’t prevent any of us from making mistakes. But through the criticism of colleagues, errors are gradually corrected and we approach truth. The mentor communicates the thrill of discovery—no drug is more addictive (21). The mentor relates to the fellow the comfort derived from knowing that the research of today is connected to a much greater process: contributing to the increase in scientific knowledge and improved care of patients—work of everlasting value. This thought helps one realize how trivial are the slings and arrows of everyday life. But comfort of mind must not spill over into complacency. Jacques Monod, one of the founders of molecular biology, warned, “Personal self-satisfaction is the death of the scientist. Collective self-satisfaction is the death of research. It is restlessness, anxiety, dissatisfaction, agony of mind that nourish science” (22). Proper balancing of anxiety and comfort of mind achieves equanimity.

The most creative individuals are driven by curiosity, getting their reward directly from their work (causing colleagues to think them odd) (18). The best people in an organization want to work for reasons beyond salary or title, as if volunteers (23). The mentor relates the sense of fulfillment from working in public service (adding that thanks is rarely vocalized, and is communicated least when the responsibility is greatest). Addressing young people, Albert Schweitzer said, “I don’t know what your destiny will be, but one thing I know: the only ones among you who will be really happy are those who will have sought and found how to serve.” There is no smaller package than an individual wrapped up in him or herself.

The mentor raises the bar and sets high standards. The fellow is encouraged to achieve full potential: to reach for, and achieve, more than he or she thought possible (24). People are not motivated by small challenges. “Make no little plans. They have no magic to stir men’s blood,” mused Daniel Burnham, the Chicago architect. The mentor helps the fellow to take risks, to move outside a zone of comfort. Expectations are lofty, yet realistic (7). The idea is to distend, but not perforate.

Confidante

The mentor serves as a confidante: someone the fellow can talk to, knowing the discussions are kept in strict confidence. Mentoring is more an affair of the heart than of the head (7, 25). It is a two-way relationship based on trust—the glue that prevents the units of daily living from falling asunder. The mentor wins and sustains the fellow’s trust through constancy (staying the course), reliability (being there when it counts), integrity (honoring commitments and promises), and congruity (walking the talk) (26).

For the fellow’s development, the mentor’s most critical function is to help the fellow live out a dream (1, 6). A young person’s dream is a personal myth, an imagined drama in which he or she is the central character—a role widely portrayed in literature. The mentor helps the fellow realize this dream through affirmation and by helping the fellow emerge in a new world. Mentoring involves an elemental form of the parental impulse, yet is quite different (6). Unlike a parent, the mentor must also be part peer. Excessive paternalism in a mentor will interfere with the primary function as a transitional figure. The mentor’s task is to liberate the fellow, and not be overly protective. An actual parent can provide some of the functions of a mentor. But he or she cannot be the primary mentor figure because a parent is too closely connected to the offspring’s pre-adult development (in both their minds) (6).

Objectivity must be maintained: the relationship must not be seen as favoritism. The mentor not only conveys compliments, but also points out weaknesses (6, 7). When criticizing, the mentor focuses on behavior, not the person. Specificity is especially important: not much can be learned from vague criticism (or vague praise) (25). A hundred-year-old letter from William Osler, mentor to Harvey Cushing, can be seen in the online supplement (1). Osler points out that specific aspects of Cus-
ing’s behavior will be fatal to his success. Osler specifies why this behavior is a problem, and ends by saying he knows that Cushing will not mind the criticism because he understands that Osler has his interest at heart. There is no fellow that does not need to have aspects of behavior criticized. But the task requires considerable tact: inept criticism surpasses mistrust, personality struggles, pay disputes, and power struggles as a source of conflict on the job (25). By holding up a mirror, the mentor enables the fellow to see how his or her character is developing (5).

The fellow has feelings of respect, admiration, and appreciation for the mentor, but also feelings of inferiority, intimidation, envy, and resentment (6). The fellow oscillates between beliefs of being an inept novice, fraudulent imposter, and a rising star that will outshine the mentor. Starting out in a subservient position, the fellow matures to become an equal over time and the relationship evolves into a meaningful friendship. But the relationship can also dissolve into bitterness (6). This may occur because the mentor is bad. Or because of arrogant ingratitude on the part of the fellow. Tacitus grumbled that man is more willing to repay an injury than repay a benefit, because gratitude is a burden whereas revenge is a pleasure.

AND SOME SPECIFICS

Handling Failure

Because it is disheartening, we think of failure as all negative. But it’s not (15, 27). Failure tells the size of the challenge taken on. A research project that appears a totally safe investment has a much smaller chance of making a substantial advance than a project carrying a distinct chance of failure. Fear of failure is the death of progress. A fellow can learn more from failure than from success, because one has to ask oneself why one failed. With success, a fellow may get rewarded for the wrong reasons, which encourages bad habits. Major achievers are rarely satisfied by success, and are instead spurred on—rather than deterred—by setbacks (11). “I regard every defeat as an opportunity,” affirmed Jean Monnet, founding father of the European Community (19). But failure is bruising, and the fellow has to learn not to show it. When the fellow encounters failure, the mentor is there to provide reassurance and to caution that dwelling too much on the past can rob one of the future.

Steps to Success

Along the way, the mentor shows the fellow what is needed for success. Success is not achieved by short cuts and gimmickry, but by hard work and persistence (5). “Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence, determination alone are omnipotent,” counseled Calvin Coolidge (28). Persistence is the hard work you do after you get tired of doing the hard work you have already done (14). The fellow needs to think of a task as beyond the whole. When running a 100-yard dash, serious runners aim for 110 yards, so no one will beat them in the last few yards. If they run fast for only 95 yards, the lack of those final 5 yards makes the first 95 pointless (23).

The second requirement is focus, the principle most often violated. Focus needs mental discipline, which is unpopular. Without focus, the fellow ends up with numerous unfinished projects.

Time management is third. Time is the most scarce resource in academic life. Yet it’s treated as having no value. Time is inelastic. “Work expands so as to fill the time available for its completion,” says Parkinson’s Law (17). Academicians who complain the most about being extremely busy are often the lowest achievers. The mentor teaches the fellow to document for him or herself where the time goes, to spot time wasters and be ruthless in eliminating them. And the fellow learns that wasting time that leads to innovation is good, and dumping bad work is efficient.

The fourth requirement for success is learning how to handle the natural desire for credit (29). Originality, and its corollary priority, are major driving forces in science—aggravated by the tendency for discoveries to be made simultaneously in more than one laboratory. Attaining priority requires ambition, a word with many meanings and wide variation in moral implications (30). Ambition is healthy when it connotes persistence, resolution, and discipline. But vaulting ambition that includes corner cutting and self-promotion is a disfigurement. The best way to get research done, and succeed in academia, is not to mind who gets credit for it (29). Lots of praise early in a career—even when deserved—can make it more difficult to cope with subsequent setbacks (29). This thought is communicated in the saying, “I have been told of so many coming men. But where do they all go”? And in, “Whom the gods wish to destroy they first call promising.”

Picking a Mentor

When scouting for a mentor, what should the fellow look for? Fellows in their late twenties should seek mentors in their late thirties or forties—a half-generation older (6). Forty-year-old faculty members have usually shed some of their earlier envies, animosities, and petty vanities, enabling them to be more understanding mentors. Enthusiasm is the most important quality: the mentor believes his or her research area is the most exciting in the world. Time: the good mentor makes time to see the fellow, even though he or she may be the busiest person on campus. Leadership always comes down to a question of character: an inner set of values directing a person to what is virtuous or right (18, 31). The world loves talent but pays off on character (27). Next come commitment, common sense, competence, responsibility, and conscience (the inner voice that says somebody may be looking). Because the fellow will need advice about future career, he or she needs a mentor who has good judgment. The good and bad are never neatly separated and most of life is spent making discriminate judgments at the margins (30). In truth, the challenge is more complicated: the choice is rarely between straight bad and good, but in picking the best trade-off among several good options (32). Judgment is the ability to combine hard data, questionable data, and intuitive guesses to arrive at a conclusion that events prove to be correct (33). And lastly the fellow looks for maturity, self-confidence, vision, and a mentor with awareness of what’s happening in the academic world outside his or her own institution.

A bad mentor sounds like a contradiction in terms, but some fellows get stuck with a faculty supervisor who lacks mentoring skills (6). The bad mentor is selfish with time. (Time given by a good mentor is immeasurable—and the part least recognized by people who are not mentors.) A bad mentor wants all the glory—it’s not enough to see the fellow shine—and may even envy the attention the fellow attracts. Instead of nurturing academic development, the mentor exploits the fellow as a technician. A mentor may also act like Professor Higgins in My Fair Lady and try to make the fellow into an image of his or her own choosing, rather than fostering individuality and independence. An overprotective mentor, though meaning well, is also bad for the fellow’s development.

Mentoring at a Distance

When fellows find no faculty member to serve as a mentor, they must take responsibility for aspects of their own education. Some
mentors in history—Shakespeare and Beethoven—had no personal mentors (34). Einstein received his mentoring at a distance through reading Mach, Poincaré, and Maxwell (34). Churchill never attended university, and educated himself by studying the works of Gibbon, Macaulay, and others (35); the permanent effect of the former two is evident in Churchill’s oratory and writing. The total aggregate of Lincoln’s schooling amounted to less than a year (30). But he was a bookworm, and over time Lincoln’s intellectual self-confidence surpassed that of graduates of the best universities. Books enable a person in isolated circumstances to communicate across years and oceans with the greatest of minds (30). Many leaders have their principal mentors and models entirely in books (26). For example, Nelson Mandela was hugely inspired by General Kutuzov in Tolstoy’s War and Peace (36). Researchers of any age can benefit from the insights and maxims contained in the books of Peter Medawar, Michael Polanyi, Richard Feynman, and John Ziman.

Not Pure Altruism

Mentoring is a two-way street, with mentors needing fellows as much as the latter need a mentor (6). As with all teaching, mentors learn more from pupils than they teach them. A researcher gets more done by involving bright young people on projects than working as a lone wolf. The mentor benefits from the reflected glory of the fellow who does well. But the major benefit is the fun of interacting with young people. The interchange liberates forces of youthful energy within the mentor, and he or she gets rejuvenated (6). Osler warned that the physician “who wraps himself in the cloak of his researches, and lives apart from the bright spirits of the coming generation, is very apt to find his garment the shirt of Nessus”—and he will also miss out on “the greatest zest in life” (37). By communicating the most important values of medicine, the mentor satisfies the Hippocratic obligation of passing knowledge to the next generation and at the same time satisfying the desire to pay back (1). “I hold every man a debtor to his profession,” intoned Francis Bacon.

CONCLUSION

In guiding Telemachus, Mentor was assisted by Athena, the Greek goddess who embodied good counsel, prudent restraint, and practical insight (1). Mentors in academic medicine are mere mortals, and do not get help from Greek goddesses. The virtues I list for the ideal mentor are intimidating. A wise reader may wonder whether through writing this essay, I am succumbing to the counsel of my fellow Irishman, Oscar Wilde: “I always pass on good advice. It is the only thing to do with it. It is never of any use to oneself.”

Conflict of Interest Statement: M.J.T. is editor of AJRCCM. He receives a fixed stipend from the American Thoracic Society. He does not receive financial support for research from pharmaceutical, biotechnology, or medical device companies. He does not serve as a consultant to or on the advisory board of any company. He receives royalties for two books on critical care published by McGraw Hill, Inc.

References

Questions/Exercises
NIH-HHS Mentoring Program

Below are some reflective questions to use as preparatory exercises for participation in a NIH-HHS Mentoring Program relationship.

We would appreciate your taking the time to ponder and respond to the questions below. These can serve as launching grounds for your early communications with your respective mentor/mentee. This will include discussing the commonalities and/or differences among your responses, and a discussion of how mentors and mentees may work together to facilitate an effective mentoring relationship that fulfills both parties’ needs.

For Mentees Only:
- Name 3 to 5 expectations that you have for your mentoring relationship.
- Describe why these expectations are so important to you.
- Describe your view of an ideal mentoring relationship.

For Mentors Only:
- Name 3 to 5 reasons why you chose to become a mentor.
- Consider motivations that might underlie each reason you have identified and identify your primary motivation for mentoring.
- Name one major expectation that you have for the mentoring relationship.

Please also contemplate the following questions on your own:

For Mentees Only:
- How do you typically learn? Are you a proactive learner, or a passive learner?
- What are some ways that you have tried to increase your knowledge of or stay current with trends in your field?
- What are some examples of ways that you can gain knowledge from more knowledgeable people?
- Have you had an experience in which you received advice that did not match your needs or situation?
- What was its impact on your feelings? What did you ultimately do?

For Mentors Only:
- Can you remember a time in which you facilitated another person’s learning?
- What factors positively or negatively impacted your efforts?
- What did you feel or learn as a result of that experience?
- What would you have done differently?
- What are specific things that you can and are willing to do to help the individual with whom you are paired?
Questions/Exercises

NIH-HHS Mentoring Program

While the Mentor is available to counsel and impart lessons learned, it is the mentee who should take the lead in the mentoring sessions. The mentee can propose agendas, facilitate the meeting, summarize agreements, and so on. Amid a busy week, sometimes you may be at a loss for ideas on what to do during the meetings and how to deepen your communication. Below please find some quick conversation starters and activities to boost your sessions:

- Spend time learning more about each other in building a personal relationship before formally tackling mentoring program objectives.
- Negotiate your ground rules for working together, when and how you will meet, confidentiality, etc. (see Mentor-mentee agreement). Schedule official times on your calendars. Sometimes an informal location, such as a coffee shop, may be preferable.
- Conduct some short telephone communications as well, with some structure added in: propose agendas and follow-up actions pertaining to the call.
- Share career stories. Career start, changes made along the way, high and low points. What experiences were helpful?
- Discuss mentee's personal vision: What would he/she like to be remembered for over the next few years?
- Talk about topics not pertaining to work: news and events, family history, hobbies, movie.
- Discuss mentee’s strengths and how to enhance their growth. (Get mentee should find information from their own observations, comments in performance reviews, informal feedback from supervisors or coworkers (by e-mail, for example), educational grades). What do people say you do best? Mentor can add his/her observations.
- Discuss mentee's growth areas and tentative plans for working on them. Discuss how feedback will be given and received, and what, if anything, either would like to avoid doing.
- Mentee assignment: Write down the picture of a perfect week. What are you doing, where are you living, how do people talk about you? Discuss these discoveries with your mentor and what you can learn/apply from them.
- Identify/refine 1-3 objectives to work on together -- preferably skills pertaining to growth areas and leveraging strengths.
- Mentee can regularly brief Mentor on a book addressing career development/another skill set that mentee is reading independently. Mentor and mentee can also read the same book together throughout the year. Communication, personality style, conflict, creativity, organization -- the subject matter can be determined by the mentee’s particular goals for growth during the relationship.
- Discuss any generational differences that may come into play in the workplace. Watch the DDM Series videocast, "What a Difference a Generation Makes," and discuss afterwards.
- Conduct informal networking by introducing mentee to at least two people who could prove helpful to their careers. Before, provide tips on issues to address or avoid, and review afterwards.
- Invite mentee to one of Mentor's key meetings. Debrief with mentee afterward.

✓ Exchange and discuss potentially useful articles.
✓ Review and discuss mentee’s resume with a critical eye, offering suggestions.
✓ Review and discuss a letter, proposal or other document written by mentee.
✓ Discuss external non-job practice round in which mentee is developing skill set (Toastmasters, leading a community project, etc.)
✓ Discuss a quote that has certain meaning or inspiration for each.
✓ Discuss any cultural values that each of you hold onto. Has culture come into play at all in adjusting to the work setting?
✓ Mentee can invite a Mentor to a presentation s/he is delivering or a meeting s/he is facilitating (with permission from mentee’s supervisor). Debrief afterwards, or in the next session.
✓ Discuss some of the “unwritten rules” each of you had observed or learned about success in your organization. How has this differed from other organizations? What other lessons have been learned?
✓ Communicate about what you have appreciated about your mentoring relationship with one another and thus far. This type of “check-in” can only be done in a note or e-mail.
✓ Mentee can research, write up or present on various career path they would consider taking within the organization. Mentor can provide feedback, provide a sounding board, discussion.
✓ Share/lend books, tapes, CDs.
✓ Discuss: How do you each best like to learn.
✓ Discuss: how would your competitors or critics describe you?
✓ Discuss a role model that has been influential in each of your lives. How has s/he impacted your decisions or beliefs?
✓ Discuss: What keeps you up at night?
✓ Meet up with other mentoring pairs for lunch, coffee or participation in an NIH community activity.
✓ Mentee and shadow mentor or observed him/her while he/she works. Debrief afterwards. Determine ahead of time what mentee particularly interested in learning about or observing first.
✓ Exchange jokes, funny stories to touch base with this side of yourselves. Bring in a favorite cartoon with respect to the workplace.
✓ If mentee agrees and there is no conflict, have lunch with mentor, mentee and his/her supervisor.
✓ Mentee can research learning opportunities (training courses, books, on-the-job activities) and vet them with mentor.
✓ Mentee can identify risks, difficulties or stress s/he is facing in the next few months (deadline, conflicts was premises, fears, etc.), and plan with mentor way to minimize them.
✓ Discuss a situation of interpersonal conflict that the mentee has experienced or successfully avoided.
✓ Discuss a situation of miscommunication that the mentee has experienced or successfully avoided.
✓ If possible, serve on a committee together on or off the job.
✓ Prepare for the end of your formal mentoring relationship: take stock of lessons learned, directions taken, and what is still needed to be accomplished.

Questions/Exercises
NIH-HHS Mentoring Program

While it may feel strange to do at the beginning, it is important to discuss and agree on the appropriate boundaries of the mentoring relationship between you and your partner early on. When boundaries are too loose, they may be misinterpreted, and when they are too rigid, they can also incapacitate the relationship. If you haven't already, or have experienced misunderstanding or confusion on this issue, please take the time to cover these bases with each other in your next session.

Everyone has different boundaries, from the degree to which one is comfortable with physical proximity, to talking about personal and confidential issues, to the amount of time one wants to spend with a mentor or mentee. As for time, NIH mentors of the HHS Mentoring Program are required to spend one hour per month with a mentee to discuss issues of growth and development one-on-one. We also recommend spending some time attending a lecture or training together, participating in a shadowing activity, or other activities.

Do take the time to talk frankly about what each of you expect to give and take in terms of time, as it will vary from relationship to relationship. Also, make sure that you are on the same page about how you prefer to interact. Questions below can guide you through this.

Both:
- Talk about your responsibilities, what you can and can’t do.
- Agree on frequency, duration and intervals of meetings/communications and how this will occur.
- Beyond agreeing to confidentiality, discuss what confidentiality actually means to each of you in various scenarios.

Mentors:
- What kind of access does the mentee have to you? What is the limit?
- Does being a mentor mean the employee has unlimited access to you for the duration of the relationship?
- Does communicating require an appointment?
- What kind of telephone access does the mentee have to you?

Refer on if necessary, using the resources listed at the bottom of this page. Debt, financial issues, or personal problems can crop up; only discuss those issues you are comfortable with and refer to the appropriate professionals below.

Mentees:
- Avoid unhealthy dependence. For example, mentors are not expected to have definitive answers or be available 24/7.
- Consider "what would I do if..." in assessing your own boundaries.
- Prioritize how you wish to best utilize your mentor’s time and expertise.
- Know there are additional resources out there for you! See below.
Master of Science in Clinical Investigation Program

Mentorship Agreement

____________________ (mentor) and _____________________ (trainee) do hereby enter into a formal mentoring agreement on this day____________________________.

Time Commitment

During the period from _____________ to _____________ the trainee commits to spend adequate time devoted to the research project. Non-research time shall not exceed:

Clinic (no more than ½ day per week)________________________________.

Call months_________________________.

Communication

The mentor and the trainee shall hold a scheduled meeting twice monthly.

The mentor and trainee shall meet every 6 months with the mentorship committee and provide a formal written report to MSCI. These individuals comprise the committee:

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

Professional Development

The trainee shall attend the following conferences and/or national meeting(s)

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________
Scientific productivity

The mentor and trainee have set the following goals for:

First abstract submission__________________________________________________
First manuscript submission_______________________________________________
Career development grant submission______________________________________

Resources

The mentor agrees to provide the following resources for the trainee’s development

Space_________________________________________________________________
Equipment______________________________________________________________
Supplies_______________________________________________________________
Personnel______________________________________________________________
Travel_________________________________________________________________

Conflict resolution

Conflicts can arise in a mentor-trainee relationship. The mentor and trainee agree to use open communication as a first step to address any such conflicts. As a next step the mentor and trainee agree to seek the counsel of the program directors and if necessary to submit to arbitration.

__________________________________________________
Trainee date

__________________________________________________
Mentor date
Lead/Scholarly Mentors have the overall responsibility for developing the creative and independent research careers of their mentees. Lead/Scholarly mentors advise their mentees about career direction and academic promotion, about navigating institutional challenges and barriers and facilitating networking on a local, national, and international level. One helpful tool to achieve this is the development of a 5-year-development plan and a feasible, coordinated research plan.

In addition to being experts in the scientific and/or methodological area that the mentee has chosen, lead/scholarly mentors are familiar with faculty and resources within and outside of their discipline at the scientific institution. These resources may include databases, space, funding, and research staff that can facilitate the mentee’s research.

Lead/Scholarly mentors assist with communication of findings including oral presentations, writing of abstracts, manuscripts and development of grant applications and securing funding. As importantly, they provide guidance to their mentees about didactic coursework and training opportunities and help them to identify potential collaborators and build a mentoring team. The mentoring team assures that the projects are progressing in a timely fashion from data collection to presentations as well as publication. The team includes co-mentors, one of them being from a multidisciplinary team, if the lead/scholarly mentor does not direct a multidisciplinary team. Lead/Scholarly mentors also insure that the mentee has a departmental career mentor who is assigned by their departmental mentor facilitator of the institution’s Faculty Mentoring Program.

The lead/scholarly mentor is responsible for one to three faculty members. S/He will meet with them on a regular basis, minimally twice a month, and insure the ongoing communication with the co-mentors of the mentoring team.
Co-mentors are responsible for working with the lead/scholarly mentor on overall mentoring responsibilities for the mentee and for providing particular guidance in their areas of expertise. The co-mentor is responsible for one to three mentees, depending on the number of the lead/scholarly mentor’s obligations and expected to meet with each mentee once per month to review the overall progress report of the mentee. The co-mentor will also be provided with the Individual Development Plan (IDP) and be familiar with its goals, challenges and the action plan that the lead/scholarly mentor and the mentee have worked out.

Research Mentors supervise the completion of a defined, time-limited research project, whether it be data collection, data analysis, manuscript preparation, grant preparation, etc. This is an excellent way for a junior faculty to begin mentoring others, learning many of the skills that will eventually allow them to become a lead mentor. For instance, s/he may supervise a summer research project, a 1-year commitment of research, or s/he may assist with the writing of papers, research grants and research reviews. The meetings will vary in timing, depending on the level of activity for the specified projects.

Career Mentors are senior faculty responsible for providing career guidance and support for their junior faculty mentees. Yet they may not be intimately familiar with the mentees research interests. It is the goal of the UCSF Faculty Mentoring Program to offer one main career mentor for each junior faculty. Career mentors provide guidance about the advancement and promotion at the scientific institution and/or in particular their department. They are expected to meet with the mentee 2-3 times a year to review the overall career goals and advise them on issues related to advancement and promotion. Ideally, career mentors will not be the mentee’s direct supervisor, but will most likely be in their home department, division or organized research unit.

Advisors have informal relationships with mentees. They may or may not have a concordant area of research, but they are familiar with the institution and program. Advisors may assist in developing and refining the mentee’s program of research, networking, family advice, and help launch their career. Meetings are usually arranged on an as needed basis.
# MSCI Bi-annual Evaluation of Mentor

1) Mentee’s Name

2) Primary Mentor’s Name

3) How many meetings have you scheduled with your primary mentor during the previous 6 months?

4) How many times did you meet with your primary mentor during the previous 6 months?

## Intellectual Growth and Development

5) Helps me become increasingly independent in identifying research questions and conducting and publishing my research

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

6) Provides constructive feedback on my experimental designs

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

7) Provides thoughtful advice on my research progress and results

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

## Professional Career Development

8) Provides counsel for important professional decisions

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

9) Maintains balance between supporting his/her own research and developing my career

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

10) Helps me to envision a career plan

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree

## Academic Guidance

11) Provides advice on my coursework and academic goals

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly agree
12) Ensures that I am firmly grounded in rules regarding ethical behavior and scientific responsibility

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

Skill Development

13) Provides constructive feedback on my presentation and writing skills

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

14) Encourages me to present my work at scientific meetings and involves me in peer review of abstracts and manuscripts

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

Personal Communication

15) Routinely monitors my progress and reviews proposed timelines and milestones with me

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

16) Provides timely feedback

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

17) Is appropriately accessible to me

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

Serves as a Role Model

18) Illustrates active teamwork and collaboration

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree

19) Illustrates good work habits

☐ Strongly disagree  ☐ Disagree  ☐ Agree  ☐ Strongly agree
MSCI Bi-annual Evaluation of Mentee

Please complete a separate form for each mentee if you have more than one.

1 Mentor’s Name

2 Mentee’s Name

3 I have the following concerns regarding my mentee’s progress:

- [ ] Issues related to research project
- [ ] Issues related to publications/grants
- [ ] Issues related to time management
- [ ] Issues related to containment of clinical duties by clinical supervisor
- [ ] Other
- [ ] None

Please describe the nature of this concern.

4 How could MSCI more effectively support your trainee?
**MSCI Bi-annual Mentorship Committee Meeting Report**

Mentorship Committee Meeting for __________________________  Date:  _________________  Location:  __________________________

Mentor:  _______________________________

Mentoring Committee:
(1) __________________________ (title)
(2) __________________________ (title)
(3) __________________________ (title)
(4) __________________________ (title)

<table>
<thead>
<tr>
<th>General Info.</th>
<th>Timeline/Dates</th>
<th>Comments / Goals for the next year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Track:</strong> Post-doctoral fellow / Physician Scientist</td>
<td>Post-doctoral fellow / Instructor / Assistant Professor of Medicine</td>
<td>Department of ______ / Division of ______ / Center for ______.</td>
</tr>
<tr>
<td><strong>Research Group</strong></td>
<td>Mentor:</td>
<td>Co-mentor (if applicable):</td>
</tr>
<tr>
<td></td>
<td>Collaborators/co-investigators and role:</td>
<td>Biostatistical co-investigator:</td>
</tr>
<tr>
<td></td>
<td>Research staff:</td>
<td></td>
</tr>
<tr>
<td><strong>Current Funding or grant on which you are working and PI</strong></td>
<td>(1) Grant name / sponsor/mentor. Title</td>
<td></td>
</tr>
<tr>
<td><strong>Grants applications pending or planned</strong></td>
<td>(1) Grant name / sponsor / mentor. Title</td>
<td>Submitted (date) Resubmission (date/due) Percentile of ___</td>
</tr>
<tr>
<td><strong>Status of on-going projects</strong></td>
<td>(1) Name of project – description of project/overview.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) Name of project/sub-project – description of project/overview.</td>
<td></td>
</tr>
<tr>
<td><strong>Manuscripts – past year</strong></td>
<td>On-service at _____, doing ____ for a total of __ weeks per year for next year.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clinic __ day/week + __ procedures</td>
<td></td>
</tr>
<tr>
<td><strong>Teaching responsibilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Committees and time commitment, interviewing, administrative responsibilities, other</strong></td>
<td>Research group meeting (when, time, how often do you meet, what is your role) One-on-one time with mentor (when, time, how often do you meet)</td>
<td></td>
</tr>
<tr>
<td><strong>Regular meetings</strong></td>
<td>Delineate 4 questions to address to the committee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>
Mentorship Challenges and Problem-Solving Strategies

The following list of common challenges to the mentee-mentor relationship was developed by the Institute for Clinical Research Education and is available online at: www.icre.pitt.edu/mentoring/challenges_solutions.html.

**Problem: Providing inadequate direction.** There are two errors a mentor can make with respect to providing direction. Providing too much help can stall a mentee’s movement toward independence and encourage dependence. Providing too little help could leave the mentee to flounder and, again, inhibit progress toward independence.

Strategy: While it is important for the mentor to stay vigilant about his or her actions, this is probably a time when the mentee has to step up and take action. It may be useful for the mentee to talk to peers to get a better picture of the extent of direction they are receiving. When the mentee has a good understanding of the situation and is prepared to discuss it with the mentor, the mentee should do so. Assuming that the mentee has a relationship of trust and uses good communication skills, the mentor will be responsive to the mentee’s concerns.

**Problem: Taking advantage of greater power.** It is important that mentors be careful about the requests they make of their mentees, since mentees are inclined to please their mentors and may perceive a request as a demand. In some cases, mentors inadvertently take advantage of their power and have a mentee take on the work of the mentor. In addition to leading to fear and resentment on the part of the mentee, this could increase the mentee’s workload and stall progress in career development.

Strategy: It may be that the mentor is unaware of his or her use of power and that a simple conversation will solve the problem; however, it is likely that a third party will be needed to mediate the situation. If possible, the third party should be someone who is senior to both the mentee and the mentor (perhaps a division chief or department chair). A meeting of the mentor, mentee, and mediator will often lead to a positive conclusion.

**Problem: Dealing with conflicting demands.** Individuals at the beginning of their career have a great deal of difficulty saying “no.” Junior faculty, fellows, and postdocs with multiple mentors or supervisors sometimes become inundated with demands for work. Since they don’t have the experience to know how to prioritize these demands, their workloads can become burdensome and a threat to their career development.

Strategy: When different mentors simultaneously want to make use of your time, it is hard to decide how to prioritize the workload. The problem is often made harder because you don’t want to disappoint anyone. One way to resolve this dilemma is to take the list of assignments to your mentors individually and ask them to help prioritize your tasks. Better yet, call a team meeting so your mentors can negotiate with one another about the priority of tasks.

**Problem: Dealing with conflicting advice.** It is inevitable that mentees with multiple mentors and advisors receive conflicting advice with respect to research or teaching plans, writing manuscripts, and other aspects of their career development. This is worth repeating: it is inevitable. Conflicting advice also inevitably leads to confusion, fear, and other negative emotions and reactions.

Strategy: Your mentors are wise and knowledgeable, but they are not infallible. When you get conflicting advice, think about what you want to do. Ask friends for their opinions. Speak to other colleagues. Everyone has been in this situation, so people will be supportive as you work out how to handle it.

**Problem: Lacking commitment.** On the one hand, a mentor may find that his or her mentee lacks the motivation and commitment to carry out the considerable work required to develop a successful career in academia. This situation is difficult for both the mentor and mentee because the mentee has a real chance of failing and because the mentor may believe that he or she has wasted a great deal of valuable time working with the mentee. On the other hand, it is also possible that the mentee feels that the mentor lacks commitment (e.g., the mentor misses meetings or does not respond to a mentee’s e-mails). The mentee’s frustrations and lack of guidance can inhibit his or her movement toward independence. Because of the differential in power between the mentor and mentee, this problem is difficult to resolve while maintaining a productive and amiable relationship.
Strategy: If a mentee is viewed as lacking commitment, it is important for the mentor to try to discern the cause. It may be that the mentee-mentor match is not working well, or it may be that the mentee has discovered that his or her career focus is no longer appealing. The junior people here tend to be highly motivated and committed to academic careers, so while there may be an occasional case in which there is a real lack of commitment, there is usually another issue underlying the problem and it is the mentor’s job to identify it and help resolve it. Conversely, if a mentor is viewed as lacking commitment and is missing meetings and not responding to e-mails, the mentee needs to do something about it. It may be that the mentor is unaware that the mentee is feeling neglected, or it may be that the mentor is so busy with other responsibilities that there is an unfortunate lapse in mentoring. Remembering that individuals who have agreed to be mentors already have a strong commitment to the process, the mentee should raise the issue with the mentor. If it is an especially busy time for the mentor, the mentee can ask if the mentor wants to touch base or have meetings by phone for a few weeks. When discussing a problem such as this, it is helpful to have some solutions to propose.

**Problem: Neglecting the mentee or the mentor.** It is important to pay appropriate attention to both the mentee and the mentor. Mentees need to respond in a timely fashion to requests and recommendations from their mentors. Mentors need to be available to their mentees on a regular basis but should also be sensitive to the times when their mentees need extra support or feedback.

Strategy: Try to maintain awareness of the other individual and what he or she is experiencing. By being vigilant, you will know when something is up, and you may be able to offer a hand.

**Problem: Crossing boundaries.** Boundaries—both professional and personal—tend to be sensitive. Crossing boundaries has the unfortunate effect of making both parties uncomfortable and has the potential for creating tension in the mentee-mentor relationship.

Strategy: To avoid this problem, the mentee and mentor should discuss boundaries at the onset of the relationship. Different people may have different ideas about what the boundaries should be. For instance, is it appropriate for a mentor to ask a mentee to babysit? This crosses the line because the power differential between mentee and mentor could result in a perception of coercion. If the issue is work-related (e.g., a mentor asks a mentee to give a talk that the mentor agreed to give), the extent to which a boundary has been crossed is less clear. Being prepared will help avoid problems down the line. It may also be useful for mentees to talk to a peer or a peer’s mentors to ask for their perspectives on the issue. As in most other challenges, honest and direct communication can solve a number of problems. However, some boundaries—especially those of a sexual nature—should never be crossed.

**Problem: Discovering a mismatch between mentor and mentee.** Unfortunately, a mismatch between a mentor and mentee can occur. The mismatch may result from conflicting personalities, differing career goals or areas of scientific expertise, differences in work ethic, or any number of other reasons. Fortunately, the mismatch is usually discovered early in the relationship by the mentor, the mentee, or both. The longer the mismatch continues, the more difficult it is to resolve.

Strategy: While finding a mismatch is regrettable, it is a problem that is relatively simple to correct. If both the mentor and the mentee believe that a switch is desirable, the mentee can work with his or her division chief, department chair, and even the current mentor to help identify a more appropriate mentor.

**Problem: Breaching confidentiality.** Confidentiality is sacrosanct in the mentee-mentor relationship. A breach of confidentiality has the potential for irrevocably rupturing the mentee-mentor relationship. At a minimum, breaching confidentiality will cause considerable damage to the trust established between the mentor and mentee.

Strategy: This is a difficult problem to resolve, so it is best to avoid it altogether. At the onset of the relationship, mentees and mentors need to identify the kinds of things that should be confidential, and they need to be up-front about what is acceptable and what is not. When one party thinks there is a reason for disclosing confidential information, he or she should talk with the other to obtain permission in advance. If, however, a breach of confidentiality has occurred and you want to preserve the relationship despite the lapse in confidentiality, you can try to rectify the situation. The mentor and mentee should make clear what they thought happened and what they can do to avoid the situation in the future. It is vital not to assume intentionality, and the mentee and mentor should try to rebuild the relationship through communication and negotiation. Rebuilding can occur only if both the mentee and the mentor want to preserve the relationship.
**Assistance with the Mentoring Relationship**

The resources outlined in this Mentoring Guide are designed to facilitate positive mentor-mentee interactions and to assist you in addressing issues that arise. The expectations outlined in this guide help to alert MSCI leadership to areas where additional assistance is needed.

The MSCI Program Director and other program staff are available to assist both mentors and mentees with issues related to the mentoring relationship. Please do not hesitate to contact us for assistance.
Vanderbilt University
Master of Science in Clinical Investigation

PROGRAM OFFICE
www.medschool.vanderbilt.edu/msci/

T. Alp Ikizler, MD
Program Director
Catherine McLaughlin Hakim Professor of Medicine
Director of Clinical Research in Nephrology
alp.ikizler@vanderbilt.edu

Eric D. Austin, MD, MSCI
Associate Program Director
Assistant Professor of Pediatrics
Director of Vanderbilt Pediatric Pulmonary Hypertension Program
eric.austin@vanderbilt.edu

Arnita L. King, MEd
Interdisciplinary Program Coordinator
2525 West End Ave, Suite 751
Nashville, TN 37203
☎: 615-322-3480
arnita.king@vanderbilt.edu